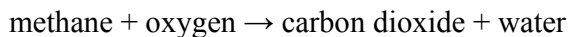


Balancing Chemical Reactions

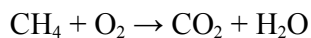
Reactants are chemicals that take part in a chemical reaction.

Products are the chemicals “created” by a chemical reaction.

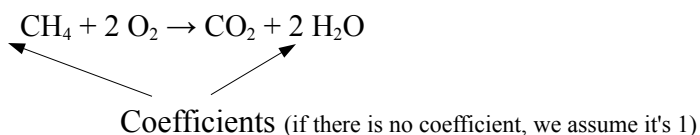
A **word equation** identifies the reactants and products of a chemical reaction by name.



A **skeleton equation** lists the chemical formula of each reactant and product.



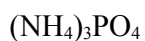
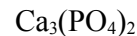
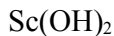
A **balanced chemical equation** gives a relative *number* of each type of molecules (a **coefficient**) to show how many of each type of molecule is involved in a reaction.



The equation $\text{CH}_4 + 2 \text{O}_2 \rightarrow \text{CO}_2 + 2 \text{H}_2\text{O}$ is *balanced* because in total, there is 1 carbon atom on each side, 4 hydrogen atoms on each side, and 4 oxygen atoms on each side.

Watch out! Polyatomic ions can be treated as packages, and you have to consider what's inside each package when you balance equations. For example, $(\text{NH}_4)_3\text{PO}_4$ has **3 N, 12 H, 1 P and 4 O**.

Count the number of atoms in each molecule shown below.



We need to balance equations, since the **law of conservation of mass** says: *in any chemical reaction, the mass of the products is always equal to the mass of the reactants* (i.e. matter can be neither created nor destroyed).

The trick is to use coefficients to make the number of each type of atom the same on both sides!

Balancing chemical equations just takes practice...you'll find your own favourite method as time goes by. Try some of these, which start easy and get progressively more tricky:

